

### **REMARKS**

Reconsideration and allowance in view of the foregoing amendment and the following remarks are respectfully requested.

Claims 1-10 are now pending. Claim 9 stands withdrawn as directed to a non-elected invention.

Claims 1-8 were rejected under 35 USC 112, second paragraph, as being indefinite. Applicant respectfully traverses this rejection.

It is respectfully submitted that the use of the term "substantially" is well accepted in mechanical claims such that, for example, characterizing the junction as "substantially" curved means that it is predominately or effectively curved even if not continuously curved at each point along the surface. However, to advance prosecution and because claim 1 does not in any event require that the fused junction layer have a continuously curved outer surface, the term substantially has simply been removed from claim 1. In view of the foregoing, reconsideration and withdrawal of the Examiner's rejection under 35 USC 112, is respectfully requested.

Claim 1 was rejected under 35 USC 102(e) as being anticipated by Matsutani (USP 6,304,022). Claims 3 and 4 were rejected under 35 USC 103(a) as being unpatentable over Matsutani. Applicant respectfully traverses these rejections.

Anticipation under Section 102 of the Patent Act requires that a prior art reference disclose every claim element of the claimed invention. See, e.g., Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1574 (Fed. Cir. 1986). While other references may be used to interpret an allegedly anticipating reference, anticipation must be found in a single reference. See, e.g., Studiengesellschaft Kohle, G.m.b.H. v. Dart Indus., Inc., 726 F.2d 724, 726-27 (Fed. Cir. 1984). The absence of any element of the claim from the cited reference negates anticipation. See, e.g., Structural Rubber Prods. Co. v. Park Rubber Co., 749 F.2d 707, 715 (Fed. Cir. 1984).

Anticipation is not shown even if the differences between the claims and the prior art reference are insubstantial and the missing elements could be supplied by the knowledge of one skilled in the art. See, e.g., Structural Rubber Prods., 749 F.2d at 716-17.

In order to prove obviousness, a challenger must present prior art references which disclose the claimed subject matter of the patent/application in question. If separate prior art references each disclose separate elements of a claim, the challenger must also show some teaching, suggestion, or incentive in the prior art that would have led one of ordinary skill in the art to make the claimed combination. See, e.g., Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 297 n.24, 304-05 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986). In determining obviousness, there must be some reason other than hindsight for selectively combining the prior art references to render the claimed invention obvious. See, e.g., Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143 (Fed. Cir. 1985).

According to the invention as recited in claim 1, the noble metal chip laser-welded to the earth electrode at one end has, at the other end, a cross-sectional area which is not less than  $0.12 \text{ mm}^2$  and not more than  $0.15 \text{ mm}^2$ . The length from the end surface to a top surface of the tip is not less than 0.3 mm and not more than 1.5 mm. Further, at the welding portion in which the earth electrode is alloyed with the noble metal chip, the outer surface connecting the side surface of the noble metal chip to a junction plane between the earth electrode and the noble metal chip has a curved surface which is concave (claim 1), preferably with a radius of curvature R (claim 10). Thus, the invention may be characterized as a spark plug comprising a noble metal chip that is connected to the earth electrode through a fused junction layer that is tapered toward the chip, and the surface of which is concave. This structure provides an improved connection strength between the chip and the earth electrode with a sufficient ignitability because the boundary area b is made larger and the surfaces bridging over surfaces 43, 47a and 45a are smoothly connected to reduce thermal

stress. This feature can improve the strength at the junction between the earth electrode and the noble metal chip with ignitability being kept.

Matsutani discloses a spark plug in which an Ir alloy chip having a thickness of 0.6 mm and a diameter of 0.8 mm is laser-welded to the earth electrode. However, Matsutani fails to disclose an assembly in which the outer surface connecting the side surface of the noble metal chip to a junction plane between the earth electrode and the noble metal chip is a concavely curved surface, as specified in claim 1, much less curved with a radius R as recited in claim 10.

In this regard, the fused junction layer between the earth electrode and the chip in Matsutani '022 is illustrated e.g., in Figure 2B and 2C as being a weld W having a straight line surface extending between the chip 32 and the earth electrode 4. In Figure 21, the weld W is shown as convexly curved as a bulge. Thus, Matsutani does not in anyway teach or suggest a fused junction layer as claimed in claim 1 having a concavely curved outer surface continuously connecting the peripheral outer surface of the chip to the end surface of the earth electrode. The Examiner's attention is directed in this regard to Figures 4 and 8b of the present application wherein the curved surface 47a provided in accordance with the claimed invention is provided at the junction of the chip 45 and the earth electrode.

In view of the foregoing, reconsideration and withdrawal of the rejection based on Matsutani '022 is respectfully requested.

Claims 2 and 7 were rejected under 35 USC 103(a) as being unpatentable over Matsutani '022 in view of Gotou (USP 6,078,129). Applicant respectfully traverses this rejection.

These claims are submitted to be patentable over Matsutani '022 for the reasons advanced above. The Examiner's further reliance on Gotou does not overcome the deficiencies of the primary reference noted above. Indeed, Gotou includes disclosure

relating to the attachment of a noble metal chip on the tip of a center electrode. As such, Gotou does not teach any modification to the chip/end electrode junction configuration of Matsutani '022.

It is clear that the initial burden of establishing a basis for denying patentability to a claimed invention rests upon the Examiner. In re Piasecki, 745 F. 2d 1468, 223 U.S.P.Q. 785 (Fed Cir. 1984). In establishing a *prima facie* case of obviousness under 35 U.S.C. § 103, it is incumbent upon the Examiner to provide a reason why one of ordinary skill in the art would have been led to arrive at the claimed invention from the prior art. Ex part Clapp, 227 U.S.P.Q. 972 (BPAI 1985). To this end, the requisite motivation must stem from some teaching, suggestion or inference in the prior art as a whole or from the knowledge generally available to one of ordinary skill in the art and not from applicant's disclosure. See, for example, Uniroyal, Inc. v. Rudkin-Wiley Corp. 837 F.2d, 7 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

Section 103 does not allow the Examiner to engage in picking and choosing from the prior art only to the extent that it will support a holding of obviousness, while excluding parts of the prior art essential to the full appreciation of what the prior art suggests to one of ordinary skill in the art. In re Wesslau, 147 USPQ 391 (CCPA 1975).

In a present case, it is applicant's disclosure, not the record art, that suggests that the shape of the fused junction of the chip to the earth electrode should be configured as claimed.

Therefore, reconsideration and withdrawal of the rejection of these claims is requested.


Claims 5, 6 and 8 were rejected under 35 USC 103(a) as being unpatentable over Matsutani '022 in view of Toya (USP 4,786,267). Applicant respectfully traverses this rejection.

These claims are submitted to be patentable over the applied art for the reasons advanced above. The Examiner's further reliance on Toya does not overcome the deficiencies of the primary reference noted above. In this regard, Toya does not teach or in anyway suggest that a fused junction between a chip and an earth electrode should be configured as specifically claimed by applicant, in the combination claimed. It is therefore respectfully submitted that these claims are allowable over the prior art as well.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance and an early Notice to that effect is earnestly solicited.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

By:   
Michelle N. Lester  
Reg. No. 32,331

MNL:slj  
1100 North Glebe Road, 8th Floor  
Arlington, VA 22201-4714  
Telephone: (703) 816-4000  
Facsimile: (703) 816-4100